

CLAIMS

What is claimed is:

1. A modular power converter comprising:

5 an EMI shielding assembly including a support incorporating integral EMI shielding features and at least partially defining an electrical reference plane, and an enclosure at least partially surrounding the support and electrically coupled to the reference plane; and

a power electronics circuit supported on the support;

10 the shielding assembly providing contiguous shielding having intrinsically low impedance paths for EMI originating from the power electronics circuit and from sources external to the shield assembly during operation.

2. The modular power converter of claim 1, further comprising low impedance conductive paths for EMI at connections to the EMI shielding assembly and power

15 electronics circuit.

3. The modular power converter of claim 1, wherein the integral EMI shielding features includes a flange at least partially surrounding the support.

20 4. The modular power converter of claim 1, wherein the support is a single-piece support.

5. The modular power converter of claim 1, wherein the support is a multi-piece support.

25 6. The modular power converter of claim 1, wherein the enclosure comprises a metallic cover.

7. The modular power converter of claim 1, wherein the enclosure comprises a metallized plastic cover.

5 8. The modular power converter of claim 1, wherein the enclosure includes a canister in which the support is disposed.

9. The modular power converter of claim 1, wherein the enclosure includes a multi-piece housing in which the support is disposed.

10 10. The modular power converter of claim 1, further comprising a connector system providing contiguous EMI shielding for conductors coupled between the power electronics circuit and external circuitry.

15 11. The modular power converter of claim 1, wherein the support is cooled to remove heat from the power electronics circuit during operation.

12. The modular power converter of claim 11, wherein the support includes inlet and outlet ports and a coolant circulation path therebetween.

20 13. The modular power converter of claim 1, wherein the power electronics circuit comprises a uni-directional power converter.

14. The modular power converter of claim 1, wherein the power electronics circuit comprises a bi-directional power converter.

25 15. A modular power converter comprising:
a power electronics circuit;
an EMI shielding assembly including a support incorporating integral EMI shielding features and at least partially defining an electrical reference plane, and an enclosure at least

partially surrounding the support and electrically coupled to the reference plane, the shielding assembly providing contiguous shielding having intrinsically low impedance paths for EMI originating from the power electronics circuit and from sources external to the shield assembly during operation; and

5 low impedance conductive paths for EMI at connections to the EMI shielding assembly and power electronics circuit.

16. The modular power converter of claim 15, wherein the integral EMI shielding features includes a flange at least partially surrounding the support.

10 17. The modular power converter of claim 15, wherein the support is a single-piece support.

15 18. The modular power converter of claim 15, wherein the support is a multi-piece support.

19. The modular power converter of claim 15, wherein the enclosure comprises a metallic cover.

20 20. The modular power converter of claim 15, wherein the enclosure comprises a metallized plastic cover.

21. The modular power converter of claim 15, wherein the enclosure includes a canister in which the support is disposed.

25 22. The modular power converter of claim 15, wherein the enclosure includes a multi-piece housing in which the support is disposed.

23. The modular power converter of claim 15, further comprising a connector system providing contiguous EMI shielding for conductors coupled between the power electronics circuit and external circuitry.

5 24. The modular power converter of claim 15, wherein the support is cooled to remove heat from the power electronics circuit during operation.

25. The modular power converter of claim 24, wherein the support includes inlet and outlet ports and a coolant circulation path therebetween.

10 26. The modular power converter of claim 15, wherein the power electronics circuit comprises a uni-directional power converter.

15 27. The modular power converter of claim 15, wherein the power electronics circuit comprises a bi-directional power converter.

28. A modular power converter comprising:
a power electronics circuit;
an EMI shielding assembly including a support incorporating integral EMI shielding features and at least partially defining an electrical reference plane, and an enclosure at least partially surrounding the support and electrically coupled to the reference plane, the shielding assembly providing contiguous shielding having intrinsically low impedance paths for EMI originating from the power electronics circuit and from sources external to the shield assembly during operation;

25 low impedance conductive paths for EMI at connections to the EMI shielding assembly and power electronics circuit; and

a connector system providing contiguous EMI shielding for conductors coupled between the power electronics circuit and external circuitry.

29. The modular power converter of claim 28, wherein the integral EMI shielding features includes a flange at least partially surrounding the support.

30. The modular power converter of claim 28, wherein the support is a single-piece support.

31. The modular power converter of claim 28, wherein the support is a multi-piece support.

10 32. The modular power converter of claim 28, wherein the enclosure comprises a metallic cover.

33. The modular power converter of claim 28, wherein the enclosure comprises a metallized plastic cover.

15 34. The modular power converter of claim 28, wherein the enclosure includes a canister in which the support is disposed.

20 35. The modular power converter of claim 28, wherein the enclosure includes a multi-piece housing in which the support is disposed.

36. The modular power converter of claim 28, wherein the support is cooled to remove heat from the power electronics circuit during operation.

25 37. The modular power converter of claim 36, wherein the support includes inlet and outlet ports and a coolant circulation path therebetween.

38. The modular power converter of claim 28, wherein the power electronics circuit comprises a uni-directional power converter.

39. The modular power converter of claim 28, wherein the power electronics circuit comprises a bi-directional power converter.

40. A modular power electronics module comprising:
5 a cooled support having a base extending generally in a plane and an integral flange portion extending from the plane and at least partially surrounding a component mounting area; and
a power electronics circuit supported on the support within the component mounting area;
10 wherein the support and the integral flange at least partially shield electromagnetic interference originating from the power electronics circuit during operation.

41. The modular power converter of claim 40, further comprising an EMI shielding enclosure electrically contiguous with the support.

15 42. The modular power converter of claim 40, wherein the EMI shielding enclosure includes a canister in which the support is disposed.

20 43. The modular power converter of claim 41, wherein the EMI shielding enclosure includes a multi-piece housing in which the support is disposed.

44. The modular power converter of claim 41, wherein the shielding enclosure includes a connector system providing contiguous EMI shielding with conductors coupled between the power electronics circuit and external circuitry.

25 45. The modular power converter of claim 40, wherein the support includes inlet and outlet ports and a coolant circulation path therebetween.

46. The modular power converter of claim 40, wherein the power electronics circuit comprises a uni-directional converter.

47. The modular power converter of claim 40, wherein the power electronics circuit comprises a bi-directional converter.

5